Two types of tourmaline with igneous and metamorphic origin in metamorphic rocks of north Golpayegan, Isfahan province

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(Received: 4/4/2018, in revised form: 12/9/2018)

Abstract: The Muteh-Golpayegan metamorphic complex consist of different metamorphic rocks including pelitic, semi-pelitic, carbonate, quartz-feldspathic and basic metamorphosed rocks. The metapelitic rocks include chlorite schist, biotite schist, garnet schist, staurolite schist, kyanite schist, sillimanite schist and andalusite schist. The semi-pelitic rocks contain higher amounts of quartz and lower amounts of mica. Apart from the main minerals in the rocks, which are quartz, muscovite, biotite, chlorite, garnet, staurolite, sillimanite, kyanite and andalusite, some samples contain considerable amounts of tourmaline as minor mineral. Tourmaline was studied in one pelitic sample and one semi-pelitic sample with high quartz content. Tourmaline in both lithologies contain high amounts of Na+K relative to Ca in the X crystallographical site, indicating alkaline tourmalines for the studied samples. Low Ca contents points to low uvite content or limited Ca(Fe,Mg)(Na,Al)-1 substitution. The Al content is higher than 6 atoms per formula unit (6.519-6.968), making them Al-bearing tourmalines. Tourmaline in the pelitic samples is schorl, with igneous origin from detrital tourmalines in granitoids, while tourmaline in semi-pelitic sample is dravite with metamorphic origin, more likely formed during regional metamorphism in the Golpayegan area.

Keywords: Muteh-Golpayegan; schist; tourmaline; uvite; schorl; dravite; granitoid.